

CHAPTER IX

CONCLUSION

The observations and arguments presented herein for the Khanom Gneissic Complex lead to the following general conclusion.

1) The Khanom Gneissic terrane, located in the northeastern part of the Khao Luang batholith, is characterized by mixing of granite, gneiss and other metamorphic rocks. On the basis of differences the mineralogical and structural parameters using geological and air-borne radiometric approaches and microstructure, they can be divided into 5 units, namely Haad Nai Phlao Gneiss, Khao Yoi Schist, Laem Thong Yang Gneiss, Khao Dat Fa Granite, and Khao Pret Granite. The Haad Nai Phlao Gneiss includes a equigranular, fine- to coarse- grained, biotite \pm sillimanite \pm garnet gneiss, interlayered with porphyroblastic gneiss and calc-silicate occasionally. Khao Yoi Schist consists of muscovite \pm garnet schist, quartz-mica schist, quartzite, and intercalated with calc-silicate and marble lenses. The widespread rock type, Laem Thong Yang Gneiss, is composed of porphyroblastic, biotite gneiss which is cut by younger phase of equigranular, fine- grained, biotite gneiss. The nature of the contact between these two gneisses is locally a sharp contact and the Laem Thong Yang intruded in the Haad Nai Phlao units, possibly. Both gneisses were later intruded by the Khao Pret Granite, the youngest rocks of complex are phaneritic, medium-grained biotite granite and minor phase, granodiorite. The older and foliated granite, Khao Dat Fa Granite, is equigranular, fine- to medium- grained, biotite - muscovite \pm garnet \pm tourmaline granite. The other foliated granite, leucocratic granite is small stock (unmappable) which intruded in the Khao Yoi Schist. For relation between the Haad Nai Phlao Gneiss and Khao Yoi Schist is unclear.

2) The chemical characteristics of the two gneisses and two granites with evidences as low Na/K, high alumina saturation index, strongly fractionated REE

patterns and negative Eu anomalies, indicate that they are calc-alkaline series, peraluminous suites, which generated by partial melting of metasedimentary (S-type) source in syn-collisional tectonic setting.

3) Geochemical, petrological and field investigations on the two gneisses mapped indicate that the Haad Nai Phlao Gneiss depicts the characteristics of paragneiss, whereas the Laem Thong Yang Gneiss is probably orthogneiss which may have been a sedimentary-origin granitic magma.

4) The predominant regional foliation is north-northwesterly trending. The structural synthesis points out that at least three major phases of deformation are recognized.

5) The typical metamorphic index minerals in pelitic rocks are biotite, garnet and sillimanite. These minerals are useful for identification of metamorphic isograds and zones of regional metamorphism. Three metamorphic zones are defined biotite-muscovite, biotite-garnet and sillimanite zones. The effects of contact metamorphism were locally observed, particularly in the Khao Yoi Schist unit. Typical contact metamorphic minerals are diopside, plagioclase, actinolite-tremolite and epidote. Metamorphic grade increases from southwest to northeast across the Khanom Gneissic terrain. Metamorphic isograds can be defined and are subparallel to the lithological boundaries and regional structural deformation. The Khanom Gneissic Complex has undergone medium- to rather high-grade metamorphism (upper greenschist to lower amphibolite facies) for regional metamorphism in the whole area, and locally hornblende- hornfels facies for contact metamorphism.

6) Evolution of polymetamorphic gneiss of the oldest units (Haad Nai Phlao Gneiss) are explained below.

Bedding (S_0) of the original sediments was folded during Precambrian and a planar foliation S_1 was formed nearly parallel to the S_0 foliations during the first period

of deformation and causing syn-tectonic crystallization of mica, quartz, albite, and rotational garnet, a second phase of deformation may have occurred sometimes in Triassic and produced a stronger foliation S_2 , with S_1 as folded relics and obliterated S_0 . S_2 wrapped around albite and garnet giving pressure shadows. Mica, quartz and sillimanite are syn-tectonic metamorphic assemblage. A third minor phase, folded S_2 and faulted produced a strain slip cleavage S_3 (fault) possibly during Tertiary, there is no crystal growth.

7) The age of the Khanom Gneissic Complex is uncertain at present due to lack of geochronological data. Based on the metamorphic grade, relationship of lithofacies and tectonic evolution, it is assumed the Khanom Gneissic Complex be Lower Paleozoic or Precambrian in age.



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